WHAT IS CLAIMED IS:

1. A cellular wireless internet access system comprising:

a plurality of cellular base stations located at low ground level on utility poles or buildings for transmitting and receiving in a predetermined frequency band, such frequency band having remote interference sources and recipients with said low to ground level base stations causing interference from and to said sources and recipients to be attenuated by foliage, building clutter and terrain losses;

a plurality of portable subscriber terminals each having a directly attached antenna for communicating in said frequency band with a nearby cellular base station a substantial proportion of said plurality of portable subscriber terminals and their antennas being located in buildings;

said cellular base stations having a low enough transmitting power with respect to transmission to said portable subscriber terminals to allow said low ground level mounting of said base stations for reduced environmental impact and reduced interference to and from adjacent license areas but a high enough power and high system gain and a geographically frequent location in close proximity to any one of said portable subscriber terminals to both transmit and receive to and from subscriber terminals in said buildings at high net subscriber data rates up to 6 Mbps.

2. A system as in claim 1 including means for automatically setting data rates between a base station and each subscriber terminal and then adjusting further according to the radio channel conditions measured between such base station and subscriber terminal.

3. A cellular wireless system as in claim 1 where there is a plurality of said cellular base stations and an associated plurality of subscriber terminals located in an licensed communication service area and receivers in an adjacent service area which must be protected from interference from said base stations and subscriber terminals, said protection from interference being provided by the means of a combination of spread spectrum transmission which reduces the transmitter power level required for a given

radio path data rate and quality, dynamic power control for reducing transmitter power of both base stations and subscriber terminals to the minimum level required for viable transmission, low-to-ground mounting of base stations and indoor operation of subscriber terminals such that building penetration losses, building clutter losses, foliage losses and terrain losses all attenuate the transmitted signal in the direction of the receivers in the adjacent service area whereby said measures also protect receivers in the service area from interference from adjacent service areas.

4. A system as in claim 1 where base stations are located at roof top level to maximize building penetration and multiple base stations with overlapping coverage maximize the probability of reliable coverage to any given subscriber terminal inside a building.

5. A cellular telephone system as in claim 1 where there is a plurality of said cellular base stations and an associated plurality of subscriber terminals located in an licensed communication service area and receivers in an adjacent service area which must be protected from interference from said base stations and subscriber terminals, each base station having a directional antenna with overlapping teardrop type coverage patterns which combine to provide continuous coverage of an area served by multiple base stations and are all facing in a direction away from said adjacent interference source and recipient to reject interference from said source and limit interference energy transmitted towards said source.

6. A cellular wireless internet access system comprising:

a plurality of portable subscriber terminals each having a directly attached antenna for communicating in a predetermined frequency band with a predetermined nearby cellular base station;

a plurality of cellular base stations each transmitting and receiving in said predetermined frequency band at a single frequency with a predetermined said plurality of said subscriber terminals; and

means for operating said base station on a small frequency allocation obtainable anywhere within the designated frequency band using a single frequency channel of

varying bandwidth between 6 and 24 MHz using different spread spectrum transmission chip rates; and

means for operating said base station in a time-division-duplex mode to enable said transmitting and receiving at said single frequency channel thus avoiding the need for separate channels spaced apart for transmit and receive and including means for allocating the ratio of time for transmitting and receiving on a predetermined basis said time division as a function of expected traffic demand.

7. A system as in claim 6 where each band is divided in the time domain into frames and each frame has a predetermined number of time slots allocated to control, uplink, and downlink communications between said cellular base stations and subscriber terminals.

8. A system as in claim 7 where some of said frames are dedicated to backhaul communication between base stations on a peer-to-peer basis.

9. A system as in claim 7 where the data transmission rate is increased during time domain frames used for backhaul communication by switching to directional antennas during these timeslots thus providing an improved radio channel quality to support such increased data rate.

10. A system as in claim 6 where said means for using different transmission chip rates provides high net data rates of 1.5 - 3.0 Mbps and high subscriber capacity on said small frequency allocation.

11. A system as in claim 6 including means for providing high net data rates of 1.5 - 3.0 Mbps in cells of a typical radius of 1.5 miles using a plurality of data bearer subchannels on a said single frequency channel, orthogonal downlink spreading codes for CDMA transmission, and successive interference cancellation or simultaneous uplink spreading codes.

12. In a method of operating a cellular wireless internet access system with both high data rates and maximum coverage where a plurality of base stations are each related to a

cell and are located at a low to ground level, along with a plurality of subscriber terminals in each cell to provide a relatively low level of interference to adjacent systems partially due to attenuation by foliage, building clutter, and terrain losses, but where such factors causing attenuation also causes a time delay spread of the signal due to multipath signals, the method comprising the steps of:

transmitting simultaneously on the same radio frequency channel a combined stream of data on a plurality of data bearer sub-channels, each subchannel using a different spreading code and having a data rate which is a fraction of the combined stream of data, whereby said reduced data rates increase symbol periods and thereby reduce corruption of data due to said delay spread and where such subchannels are combined and de-combined using multiplexing and inverse multiplexing techniques respectively.

13. A method of operating a cellular wireless internet access system in a government regulated predetermined frequency band subject to government regulation but where such regulations normally require the number and location of users to be recorded, directional subscriber equipment antennas to be used and subscriber equipment to be professionally installed, and where said regulations can be avoided if each transmitter has a transmitted power less than a specified threshold power the step of transmitting with power less than said threshold power by using small cells and installation of antennas at low elevation and code division multiple access transmission.

14. In a method of operating a cellular wireless internet access system base and subscriber stations in a regulated frequency spectrum having which allows the use of one or more channels of various varying channel frequency bandwidths, and where the position and number of the available channels in the band is inflexible for historical allocation reasons to preclude the use of separate uplink and downlink channels separated by a predetermined frequency spacing, the method comprising the setting, in a particular local area, of base and user stations to operate within a single chosen useable radio frequency channel; and using time division duplexing (TDD) for both transmitting and receiving on this single radio frequency channel.

15. A cellular wireless internet access system comprising: a plurality of portable subscriber terminals, each located in a small geographical area or cell related to a specific cellular base station;

a plurality of said cellular base stations each communicating with a predetermined plurality of subscriber terminals in a predetermined frequency band having a single fixed data transmission rate at each point in time where each of said subscriber terminals or users is assigned one of a predetermined plurality of service tiers, each of the tiers in said plurality of tiers each having different defined data throughput rates;

means for polling said plurality of subscriber or user terminals at a frequency determined by the defined service tier of each such terminal and receiving a traffic request by a particular base station to determine whether or not a subscriber terminal has data to send, the amount of data which is to be sent, and the service tier of that particular user

means for queuing said traffic request;

scheduling means for allocating of timeslots for subscriber terminal to base station transmission on a single frequency channel in accordance with the tier priority assigned to that each subscriber, the amount of data to be sent by each user, and the estimated wait time for a particular user in relation to that user's service tier data rate;

means for scheduling and queuing outbound data from base station to subscriber terminal in accordance with the tier priority assigned to that each subscriber, the amount of data to be sent by each user, and the estimated wait time for a particular user in relation to that user's service tier data rate;

whereby the average data rate perceived by said subscriber terminal user approximates the assigned service tier data rate.

16. A cellular wireless internet access system comprising:

a plurality of cellular base stations for transmitting and receiving in a predetermined frequency band using code division multiple access (CDMA), at least one of said base stations having access to the Internet or Intranets.

a plurality of portable subscriber terminals, each located in a small geographical area related to a specific said base station, said subscriber terminals transmitting data to a base station in said area which must be connected (backhauled) to an Internet or Intranets.

directional radio transmission means operating in said same frequency band, associated with each base station for routing said backhaul data to a base station with Internet or Intranet access directly or via an intermediate base station.

17. A system as in claim 16 where said directional radio transmission means includes two separate base station radio transmitters and receiver units of the same type at each cell site one of which communicates with said subscriber terminals on its omni-directional antenna and another of which communicates with directional radio transmission to a base station with Internet or Intranet access directly or via an intermediate base station, and where the superior radio channel created by the use of such directional antennas permits high data transmission rates than between subscriber terminals and base station.

18. A system as in claim 16 where said directional radio transmission means includes a common base station radio transmitter and receiver but with separate omni and directional antennas and including time division duplex means for allocating time slots between said antennas for communicating with subscriber terminals or exchange of backhaul traffic with other base stations and a means of increasing the transmission rates for backhaul data in timeslots allocated for such where the superior radio channel created by the use of such directional antennas permits high data transmission rates than between subscriber terminals and base station.

19. In a method as in claim 14 where the data rate able to be supported between the base station and each subscriber terminal can be determined by measurements of channel delay spread and signal to interference ratio and set accordingly, using different spreading factors to establish user data rate within a fixed chip rate of direct sequence spread spectrum transmission and where the use of time division duplex transmission on the same frequency makes the radio path conditions in both uplink and downlink directions identical and therefore able to be measured by the base station on the uplink only to determine the data rate able to be transmitted in both directions.

20. A system as in claim 1 where interference between multiple simultaneously transmitted codes on the uplink are cancelled by successive interference cancellation

means by regenerating each code successively and subtracting such regenerated code from the delayed input signal to increase the signal to interference ratio for each code, where such technique results in uplink performance with multiple non-orthogonal uncorrelated codes being similar to that of multiple orthogonal codes in the downlink, all other factors being equal, and allows equal data transmission rates on both uplink and downlink for the same cell size.

21. A system as in claim 1 where said base stations are linked to network controller means having a plurality of core network function units such units each having an Internet access;

said units being distributed and co-located with a unique plurality of said base stations whereby total volume of data to be carried by backhaul transmission is reduced.